

Optivity Policy Services for the Enterprise

Features and Benefits

- End-to-end network QoS provisioning
- Optimized performance of business-critical applications
- Common Open Policy Service (COPS) protocol support
- Efficient bandwidth management
- Multi-vendor, multi-directory capabilities

You understand your business priorities, but your network doesn't. Multimedia, Web, electronic commerce, and Enterprise Resource Planning (ERP) traffic all compete for the same resources, regardless of each application's relative importance to your business. As telephony and data networks begin to converge, network resources are becoming even more valuable and need to be managed efficiently to deliver maximum performance. As part of its Unified Management strategy, Nortel Networks provides a proactive management tool that uses policies to prioritize business-critical traffic: Optivity* Policy Services for the Enterprise.

Optivity Policy Services is a prime example of how Nortel Networks' Unified Management delivers efficient, effective, system-level management solutions. Rather than applying policies on a per-device basis, Optivity Policy Services takes a system-level approach to policy configuration and deployment, and allows a network manager to address the needs of telephony, video, and data applications as an integrated system.

Unified Management

Nortel Networks creates greater value for customers worldwide through the integration of telephony, video, and data networking. With its Unified Management strategy, Nortel Networks is using its experience as the leader in campus, WAN, and telephony management to bring the following core values to the enterprise network manager:

- Managing campus, WAN, and telephony networks as an integrated system.
- Delivering pragmatic, directory-based policy management.
- Application optimization.
- Operational simplicity.

The need for policy management

The dramatic increase in network traffic has made the capability to prioritize e-commerce and other business-critical applications, such as Internet telephony, a business requirement. Network administrators must be able to centrally provision network resources through the establishment of network policies. These policies can then be translated into specific device settings for classifying, policing, and shaping traffic, as well as scheduling restrictions on bandwidth utilization.

Optivity Policy Services offers an effective solution to application prioritization and bandwidth management. The solution gives customers the advantage of centralized policy control to configure QoS, enables the assignment of differentiated service levels to business-critical applications, automates QoS configuration and provisioning, and makes more efficient use of available bandwidth.

Policy-enabled networking

In a policy-enabled network, the allocation of network resources to applications, users, and groups is based on a set of defined rules. This approach provides the network manager with tight control over traffic prioritization based on the business importance of applications.

Policies are created to bind these business priorities to the allocation of available resources, instructing the network on how it should behave in specific situations.

These policies are defined based on criteria such as a user's access rights, security levels, and job requirements. Policies can also be based on application requirements, such as latency. All policies are defined within a Lightweight Directory Access Protocol (LDAPv3) directory server.

Optivity Policy Services is associated with a number of enabling technologies, including QoS, Differentiated Services (DiffServ), and the Common Open Policy Service (COPS) protocol.

- QoS refers to the performance levels extended to IP traffic as it moves through the network — performance levels that are determined by Optivity Policy Services. QoS is characterized and quantified by such metrics as availability, response time, and packet loss.
- DiffServ is a QoS architecture that sets the DiffServ (DS) codepoint in the IP header, marking the traffic at the edge of the network. The DS codepoint is used to determine appropriate per-hop behavior. Since it focuses on per-hop behavior, it does not require the complexity associated with maintaining per-flow soft state at each node.
- COPS is a client/server protocol used for communicating policy information between a policy server and its clients, such as routers or switches.

Optivity Policy Services architecture

Optivity Policy Services can provide traffic prioritization in data and telephony networks. The product's architecture builds upon a three-tier architecture that provides redundancy and fault tolerance. This architecture also allows policy-enabled networking to be achieved in a very short time frame.

For the 1.1.1 release of Optivity Policy Services, DNS and DHCP services are managed separately by Optivity NetID 4.2. Handling DNS and DHCP management and policy management with separate applications not only simplifies the architecture of Optivity Policy Services, it makes software upgrades easier and simplifies licensing. It also facilitates the identification and resolution of technical issues.

Optivity Policy Services is a software solution that consists of the following components: Policy Management Console, Application Server, Server Manager, Policy Server, Policy Directory, and runtime database.

Policy Management Console: The Policy Management Console provides a complete platform for managing policy information and Policy Servers. The Java interface gives network administrators access to the Policy Directory from any Web browser.

Application Server: The Application Server supplies Java applets for the Policy Management Console. It communicates with the Policy Management Console over HTTP and with the Policy Directory via LDAP.

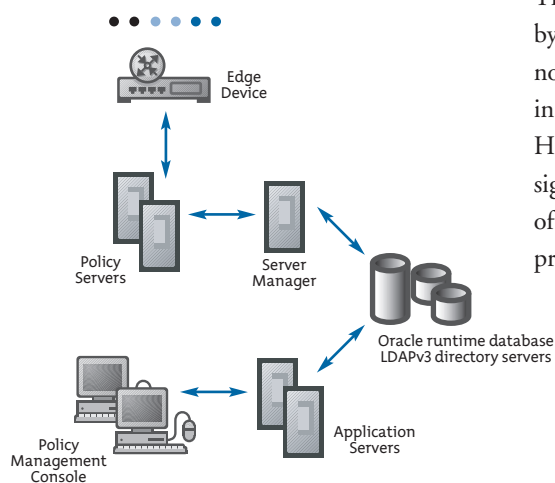
Server Manager: The Server Manager is the interface between the Policy Servers and the Policy Directory. Along with providing the servers with their initial configuration, the Server Manager delivers incremental configuration changes to Policy Servers across the network.

Policy Server: The Policy Server receives configuration data from the Server Manager and distributes it to the network devices via COPS or command line interface (CLI). Policy Servers can be distributed throughout the network for enhanced scalability.

Policy Directory: The Policy Directory is an LDAPv3 directory server that stores policy information within a Directory Enabled Networking (DEN) compliant schema.

Runtime database: The Oracle runtime database stores user and group information, as well as other operational logs and information.

Figure 1: Optivity Policy Services Architecture.



Features and Benefits

Prioritizing business-critical traffic

In a standard network, when the network traffic passing through an edge device exceeds its bandwidth capacity, the data packets are placed in queues until they can be sent. Depending on the extent of the congestion, data packets could be dropped or delayed, regardless of their importance. In an Optivity Policy Services-enabled network, when the traffic reaches the edge device, information such as source and destination IP addresses or port numbers is read from each packet. Each packet is then marked with a DiffServ codepoint to associate it with a specific service level. These service levels determine the priority of the queues; for example, all traffic with a service level of gold is mapped to a higher-priority queue than traffic with a service level of bronze. Therefore, when bandwidth becomes available, the gold traffic, which is more important to your business, is sent before the bronze traffic.

The classification process performed by a policy-enabled edge device does not reduce the overall throughput of data in comparison to standard edge devices. However, classifying packets does significantly enhance the throughput of business critical data, since it is given preferential treatment.

End-to-end QoS network provisioning

Optivity Policy Services implements QoS end-to-end across Nortel Networks devices such as Passport* 8600 Routing Switches, BayRS routers, and Passport 6400 Multiservice Switches. Many infrastructure vendors support policy-based management, but only on their WAN edge routers. The Nortel Networks Optivity Policy Services solution supports policy-based management on edge routers as well as Layer 3 switches, allowing QoS provisioning to be established at every level, from the access edge to the server farm.

Optimized performance of business-critical applications

Low-priority application traffic can frequently compromise the performance of business-critical and latency-sensitive traffic. Instead of settling for a best-effort level of service for all traffic, Optivity Policy Services provides network managers with the ability to assign appropriate service levels for business-critical applications. For example, customers can use Optivity Policy Services to prioritize business-critical traffic, such as SAP, over traffic that has less significance to their business, such as routine Web traffic.

Centralized QoS configuration and management

Configuration of QoS priorities across the network on a per-device basis is unwieldy and time-consuming. Policy management provides the most effective, efficient way to manage QoS in an enterprise network, and Optivity Policy Services provides a framework that simplifies the management and configuration of QoS features.

Policies are defined from an intuitive management interface, classifying traffic by the DS codepoint in the IP packet header, and then downloaded to devices via centralized Policy Servers.

Efficient bandwidth utilization in the WAN

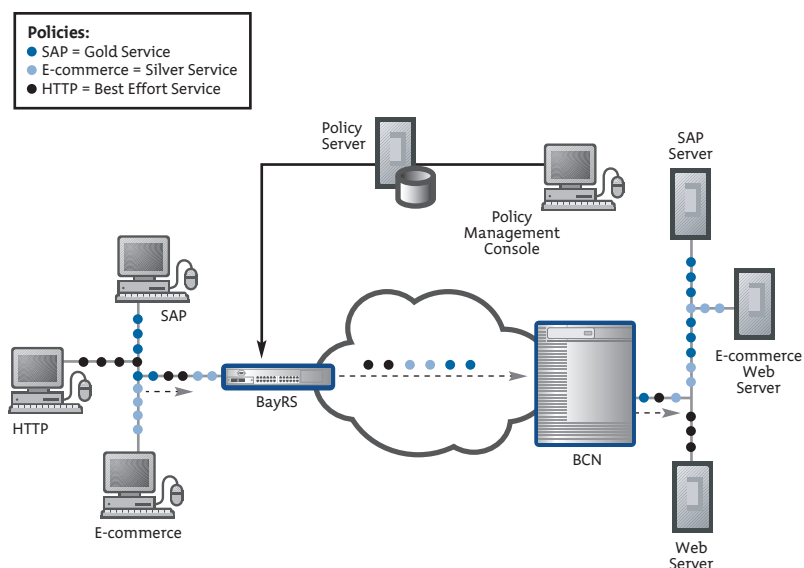
Adding bandwidth resources in the WAN is an expensive proposition that requires continual capacity planning as network usage increases. It also cannot guarantee the performance of business-critical applications. Although over-provisioning bandwidth does relieve congestion, spikes in the amount of traffic flowing over a network can still tie up bandwidth and interrupt business-critical applications' transmissions. Optivity Policy Services addresses the problem of limited bandwidth in a more cost-effective manner by ensuring that traffic from business-critical applications is given greater access to WAN resources.

Classifying traffic before it is sent to the WAN is also important for WANs that use COPS-compliant devices. These COPS-compliant WAN devices will honor the markings applied to your network traffic by your edge devices so that your traffic will be given a consistent level of service end-to-end.

Multi-vendor, multi-directory

Recognizing that most enterprise networks are made up of a mixture of hardware and software from various manufacturers, Optivity Policy Services provisions policies to network elements via standard protocols, delivering support for multi-vendor environments. Policies are provisioned by COPS or by CLI (for non-standard or legacy devices), enabling

Figure 2: Application Differentiation in the Enterprise Environment.



Optivity Policy Services to support both Nortel Networks and Cisco devices. Optivity Policy Services will support BayRS 13.20, Passport 3.0, Passport 6400 V7.0, and Cisco IOS 11.3 devices.

Optivity Policy Services supports both the Novell eDirectory and the Netscape Directory Server. Also, to make the most efficient use of customer's on-hand hardware, Optivity Policy Services can be installed on either Solaris 2.6 or Windows NT 4 machines. All servers can communicate with each other according to the defined architecture, regardless of the operating system used by the machine a server is hosted on.

Extensible architecture

Optivity Policy Services leverages a three-tiered, extensible architecture to deliver a scalable policy management solution for enterprise environments. A Server Manager functions the intermediary between the directory and the Policy Server and the directory. Multiple Policy Servers can also be deployed to reduce traffic and introduce an additional level of fault tolerance.

Optivity Policy Services' open, standards-based architecture enables the solution to support IP telephony applications and IP-enabled PBX phone systems.

Scheduling

During peak network use, network managers need to make sure that application traffic that is not business-critical, such as file transfers or routine Web traffic, doesn't consume excessive amounts of bandwidth. For example, during the normal business hours of 9 a.m. to 5 p.m., bandwidth is at a premium for enterprises. Optivity Policy Services enables network managers to upgrade or downgrade service levels based not only on the time of day, but also by day of the week, or week of the month/quarter.

By creating a policy to provide a best-effort level of service for generic traffic during peak demand times, bandwidth availability can be ensured for business-critical traffic. When resources are less constrained, service levels for non-critical applications can be upgraded.

Java-based management

The Policy Management Console can be launched from Java-enabled Web browsers, enabling multiple administrators to access the centralized Policy Directory and update policy information anywhere, any time. The Policy Management Console provides an intuitive and familiar platform for policy management. The browser interface organizes information hierarchically and provides administrators with a graphical overview of the policy structure.

Differentiated Services technology

The Optivity Policy Services solution uses DiffServ technology to prioritize network traffic. Service levels are associated with a DiffServ codepoint (formerly referred to as the Type of Service or ToS byte). DiffServ is a QoS architecture that sets the DiffServ codepoint in the IP header. This marks the traffic at the edge of the

network, and it is used to determine the appropriate per-hop behavior given to the traffic by the network devices.

Application differentiation

Optivity Policy Services enables network administrators to identify traffic flows and mark these flows for priority. Network devices identify the application based on information within a traffic flow. Differentiation can be based on the following information:

- Source or destination IP address.
- Source or destination IP port.
- IP protocol.
- URL destinations and mime types.
- Arbitrary user-defined deep-packet values.

The application can then be logically “classified” based on these identifiers. When the network device detects traffic meeting the classification criteria, it will “mark” the DiffServ codepoint to prescribe downstream per-hop behavior. Based on the DiffServ codepoint, end-to-end treatment of traffic is standardized without further deep-packet inspection.

The application is then logically defined based on these identifiers. When the network device detects traffic meeting the specified parameters, it examines the packets, reads the DiffServ setting, and forwards the application traffic based on its service level.

HTML and user-based policies

In addition to creating differentiated levels of service by applications, Optivity Policy Services enables administrators to prioritize Web-based applications based on specified URLs. This allows business-critical Web-based applications that require a high level of service, such as electronic commerce, to be differentiated from and prioritized over Web-based applications that only require best-effort levels of service.

In addition, since not every user on a network requires that same level access to network resources, Optivity Policy Services can assign policies to users based on their static IP addresses. For example, a system administrator could be given a gold level of service and a product manager a silver level of service.

Hardware and Software Requirements

Table 1: Hardware and software requirements for Optivity Policy Services 1.1.

Product	Disk Space	Memory**	Platform	Hardware
Policy Management Console	As required by Web browser	As required by Web browser	Netscape Internet Explorer	As required by Web browser
Server Manager	25 MB	64 MB	Windows NT 4.0 Solaris 2.5, 2.6	Pentium 300 Sun UltraSPARC
Application Server	25 MB	64 MB	Windows NT 4.0 Solaris 2.5, 2.6	Pentium 300 Sun UltraSPARC
Policy Server	25 MB	64MB	Windows NT 4.0 Solaris 2.5, 2.6	Pentium 300 Sun UltraSPARC

Table 1: Hardware and software requirements for Optivity Policy Services 1.1 (continued).

Product	Disk Space	Memory**	Platform	Hardware
Netscape Directory Server	200 MB	64MB	Windows NT 4.0	Pentium 300
Novell eDirectory	500 MB	64 MB	Solaris 2.5, 2.6 Linux	Sun UltraSPARC
Oracle Server	500 MB	128 MB	As supported by database vendor	As supported by database vendor

**Note — Memory sizing is not cumulative.

Ordering Information

Table 2: Optivity Policy Services Ordering Information.

Order Number	Description
AH3313039-1.1.1	Optivity Policy Services 1.1.1: manages up to 100 policy interfaces on Windows NT or Solaris. Includes runtime database for NT, Oracle 8 Workgroup Server licensed for 5 users, as well as Netscape Directory Server for NT. Oracle runtime database for Solaris must be ordered separately. IP Address functionality now managed separately.

Acronym Glossary

CLI	Command Line Interface
COPS	Common Open Policy Service
DEN	Directory Enabled Networking
DiffServ	Differentiated Services (RFC 2474/2475)
DS	Diffserv
LDAP	Lightweight Directory Access Protocol
PBX	Private Branch Exchange
QoS	Quality of Service
URL	Uniform Resource Locator
WAN	Wide Area Network



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